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LISTS OF SPECIES

Ichthyofauna, Uberabinha River (Upper Paranaíba River Basin), Triangle Mineiro region, Uberlândia, Minas Gerais, Brazil

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ABSTRACT: The Uberabinha River is a tributary to the Paranaíba River and, up to now, data about its ichthyofauna was still unknown. Currently the fish community suffers threats due to environmental degradation and the construction of hydroelectric dams. The present study sought to survey the ichthyofauna of the Uberabinha River. Samples were collected in November 2011 and January 2012 using gill nets, cast nets, trawls and sieves. We captured 844 individuals, totaling 36 species of fish. This is the first record of fish from the Uberabinha River and is probably an altered assemblage due to environmental impacts caused by human actions.

INTRODUCTION

Fish fauna inventories are extremely important for understanding the diversity of Brazilian fish, especially when considering the speed with which human actions affect the water bodies. Anthropic factors have a greater impact than the mitigative conservation measures in place for this group of animals.

Studies about the ichthyofauna of the Upper Paraná Basin basin are still being further developed (Langeani *et al.* 2007). Paranaíba River is the main tributary of the complex of the Upper Paraná Basin and has the second highest diversity of fish in the State of Minas Gerais (MG). In figures, approximately 103 species are known, mostly belonging to the groups Loricariidae, Rivulidae and Characidae, plus 20 exotic species (Drummond *et al.* 2005). The Paranaíba river basin is considered a priority area for conservation because of the diversity of fish and complexity of habitats (Pavanelli and Britski 1999; Ribeiro *et al.* 2004; Drummond *et al.* 2005; Nogueira *et al.* 2010). Even with all this diversity, there are tributaries for which no systematic inventory has been carried out, as is the case of one of its main tributaries, the Uberabinha River, located near the city of Uberlândia (MG).

Sá *et al.* (2003) and Oliveira and Marquis (2002) also emphasize the importance of understanding the biodiversity of the Cerrado and of devising strategies for the conservation of the Minas Triangle region, one of the most threatened by industrial and agricultural advances. Consequently, the aim of this study was to conduct an inventory of the fish in Uberabinha River.

MATERIALS AND METHODS

Study Site

Samples were collected at four points in the Uberabinha River (tributary to the left bank of the Paranaíba River - Upper Paraná River Basin), two upstream and two downstream from a small hydroelectric central, in Uberlândia, Triangle Mineiro region (Table 1; Figure 1). The collections were authorized by IEF (Instituto Estadual de Florestas of Minas Gerais) through the capture license n° 226-11.

Fish sampling

Two sampling campaigns were carried out at each site, in November 2011 and January 2012. We used the method of direct sampling with 10 sets of gill nets and trawls with five rows of hooks arranged for 12 hours. The nets were installed systematically, ensuring identical collection efforts for all sampling stations, totaling 1,920 m^2/H at each site.

The other method is considered a random sample, with the use of nets, trawls and sieves. The fishing nets were operated 10 times per mesh (2.4 mm and 4 mm). The sieve (1 mm) and the seine (1.30 x 1.40 m, 2 mm mesh) were operated 20 times at each site.

Data analysis

The fish collected were analyzed and deposited in the Laboratório de Genética Ecológica e Evolutiva (LAGEEvo), at the Universidade Federal de Viçosa (UFV) to be identified using specific taxonomic keys and identification guides (Castro *et al.* 2004; Graça and Pavanelli 2007; Jerep *et al.* 2007; Oyakawa and Mattox 2009; Garavello *et al.* 2012) as well as by consulting specialists. Classification of species acoording Reis *et al.* 2003 and Froese and Pauly 2012. All fishes were weighed, measured and photographed. The specimens were deposited in lots LAGEEvo voucher numbers 2333 to 2411 and from 2418 to 2575.

RESULTS AND DISCUSSION

A total of 844 fish were captured, distributed among 13 families, 25 genera and 36 species. Families with most species were Loricariidae (Siluriformes) - seven species, followed by Pimelodidae (Siluriformes), Characidae (Characiformes) and Cichlidae (Perciformes) - five species each. The relationship between total species richness found in the orders Characiformes and Siluriformes corroborates

the species richness of these orders in the studies of Lowe-MConnell (1999), Pavanelli *et al.* (2007) and Barletta *et al*. (2010). Other basins such as the Tocantins River in the study of Giongo *et al*. (2011) also show this pattern.

In this inventory, exotic species accounted for 20% of the captured species, being represented by the peacock bass (*Cichla monoculus*), from the Amazon basin, and the tilapia (*Tilapia rendalli* and *Oreochromis niloticus*), from Asia and Africa. The localities with the largest number of exotic species were P1 and P2. This number of exotic species is probably related to the presence of a hydroelectric reservoir operating in that region. The introduction of exotic species in natural communities is a major threat to biodiversity, since it causes loss of biodiversity due to competition and introgression of native species with the farmed fish (Souza *et al*. 2009).

At stations P1 and P2 we also recorded an abundance of small generalist species such as *Astyanax bimaculatus*, *Hypostomus sp.* and *Rhamdia quelen*. Changes in assemblages of larger native fish by small rustic species have been portrayed previously in studies of reservoir dynamics (Agostinho *et al.* 1994; Agostinho *et al*. 1999). Agostinho *et al*. (2007) also point out that, immediately after the dams are created, it is common for r-strategist species, such as minnows and catfishes, to be successful in occupying the new habitats because they are well adapted to lentic environments.

In the present study, some native species of large size and commercial importance, such as the spotted shovelnose (*Pseudoplatystoma corruscans*) and flat-whiskered catfish (*Pinirampus pirinampu*), were captured. The distribution of these species is considered widespread in the Paraná River basin since these species can be found in several rivers of the basin. In addition, the upper Paraná River has several species in common with the low Paraná River, such as some migratory fish (Huber and Renno 2006) and species of commercial value. Some smaller species such as *Schizodon nasutus* and *Triportheus nematurus* were captured only at points P3 and P4 of the Uberabinha River, in the stretch that still has lotic characteristics.

The fish fauna of the Uberabinha River represents part

Table 1. Sampling sites, descriptions of the riparian vegetation and the Uberabinha riverbed.

SITES	COORDINATES	RIPARIAN VEGETATION	DESCRIPTION OF THE RIVERBED
P1	18°42'50.73" S 48°29'22.55" W	Both banks have been cleared of vegetation. The surroundings are mainly farms with pastures	Lentic environment with sandy bed. Depth exceeding 10 meters. Upstream from small hydroelectric central
P2	18°40'54.41" S 48°30'6.34" W	Both banks have been cleared of vegetation. The surroundings are mainly farms with pastures	Lentic environment with sandy bed. Depth exceeding 10 meters. Upstream from small hydroelectric central
P3	18°40'43.96" S 48°30'16.68" W	The margins include remnants of riparian forest	Lotic environment with rocky bed. Depth of approximately 2 meters. Downstream from small hydroelectric central
P4	18°40'36.25" S 48°30'43.94" W	The margins include remnants of riparian forest and the surroundings are mainly farms with livestock	Lotic environment with rocky bed. Depth of approximately 2 meters. Downstream from small hydroelectric central

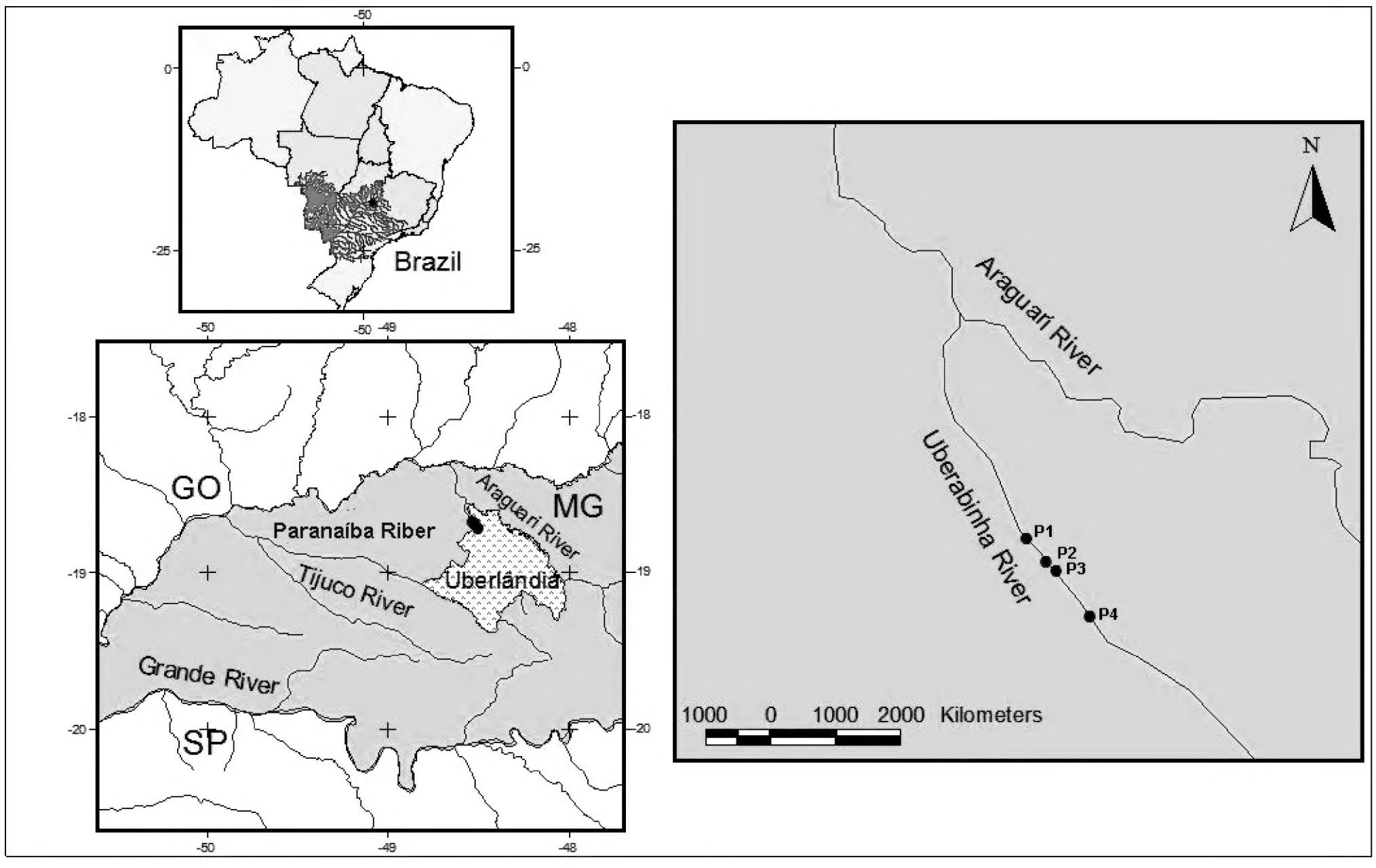

Figure 1. Sampling points Uberabinha fish in the river (Paranaíba river basin).

of the diversity of the Upper Paraná and Paranaíba River basins and is threatened due to strong anthropic pressure, such as water contamination by industrial and domestic effluents from the city of Uberlândia and loss of habitat due to degradation of riparian vegetation, sedimentation and dam construction. The Uberabinha River basin is one of the poorest with regard to ichthyofaunistic studies when compared to the detailed studies that have been carried out in the majority of the region of the Paranaíba River basin. Inventories are extremely important for the conservation of aquatic environments.

The present study confirms the importance of studying the affluents of the Paranaíba River, since the studies reveal differences in the fish fauna between different regions of the Upper Paraná River, even considering that the knowledge of the fish fauna is incipient, as proposed by Castro (1999), Langeani *et al*. (2007) and Galves *et al.* (2009).

Table 2. Species surveyed in the Uberabinha River. Popular names; taxonomic classification; sample station: 1- P1, 2- P3, 3- P4; Species category: N-native, RI- reportedly introduced, CR- critically endangered (Rosa and Lima 2008); method of collection: I- Interview, G – gill net, C – casting net, LH –trawl with hooks, S – sieves, T – seine nets

TAXON	SPECIES	VULGAR NAME	SAMPLE STATION	SPECIES CATEGORY	METHOD
CHARACIFORMES					
Characidae	*Astyanax altiparanae* Garutti and Britski, 2000	Lambari,	1, 2, 3,4	N	G/C/S
	Astyanax aff. *paranae* Eigenmann, 1914	Pratinha	1,2	N	C/S
	Triportheus nematurus (Kner, 1858)	Piaba facão	3,4	N	C
	Galeocharax knerii (Steindachner, 1879)	Peixe-cadela	4	N	I
	Serrasalmus marginatus Valenciennes, 1837	Piranha	1,2	N	I
Erythrinidae	*Hoplias intermedius* (Günther, 1864)	Trairão	1, 2,	N/RI	G
	Hoplias aff. *malabaricus* (Bloch, 1794)	Traíra	1, 2, 4	N	G
Anostomidae	*Leporinus friderici* (Bloch, 1794)	Piau-três-pintas	3.4	N	G
	Leporinus octofasciatus Steindachner, 1915	Flamenguinho	3	N	G
	Leporinus amblyrhynchus Garavello and Britski, 1987	Timburé	4	N	G
	Schizodon nasutus Kner, 1858	Campineiro	4	N	G
Prochilodontidae	*Prochilodus* lienatus (Valenciennes,1837)	Curimba	3,4	N/RI	I
Curimatidae	*Steindachnerina insculpta* (Fernández-Yépez, 1948)	Saguiru	3,4	N	G/C
	Steindachnerina sp.	Saguiru	3,4	N	G/C
	Cyphocharax nagelii (Steindachner, 1881)	Saguiru	3,4	N	G
PERCIFORMES					
Cichlidae	*Cichlasoma paranaense* Kullander, 1983	Acará	3	N	S
	Cichla monoculus Spix and Agassiz, 1831	Tucunaré-de-crista	1	RI	G
	Geophagus brasiliensis (Quoy and Gaimard, 1824)	Acará	1,2,3,4	N	G/C/S
	Tilapia rendalli (Boulenger, 1897)	Tilápia	1, 2, 3.4	RI	G/C/S
	Oreochromis niloticus (Linnaeus, 1758)	Tilápia-do-Nilo	1, 2, 3,4	RI	G/C/S
SILURIFORMES					
Auchenipteridae	*Parauchenipterus galeatus* (Linnaeus, 1766)	Cumbaca	2	N	G
Heptapteridae	*Pimelodella gracilis* (Valenciennes, 1835)	Mandí	4	N	I
	Rhamdia quelen (Quoy and gaimard, 1824)	Bagre	1,2,3,4	N/RI	G
Callichthyidae	*Hoplosternum littorale* (Hancock, 1828)	Tamboatá	3	N/RI	G/C
Loricariidae	*Hypostomus* sp. 1	Cascudo	1, 2, 3,4	N	G
	Hypostomus sp. 2	Cascudo	1,2,3,4	N	G
	Hypostomus sp. 3	Cascudo	1,2,3,4	N	G/C
	Hypostomus albopunctatus (Regan, 1908)	Cascudo	3,4	N	G
	Hypostomus auroguttatus Kner, 1854	Cascudo	1,2,3,4	N	G
	Neoplecostomus sp.	Cascudinho	4	N	G
	Hisonotus sp.	Cascudinho	3,4	N	G
Pimelodidae	*Pimelodus maculatus* Lacepède 1803	Mandi-amarelo	3,4	N	G/C
	Pinirampus pirinampu (Agassiz, 1829)	Barbado	3	N	G
	Pseudoplatystoma corruscans (Spix and Agassiz, 1829)	Pintado	3	N/RI	G
	Duopalatinus emarginatus (Valenciennes, 1840)	Mandiacú	3,4	RI	G/C
GYMNOTIFORMES					
Gymnotidae	*Gymnotus* aff. *carapo* Linnaeus, 1758	Sarapó	1, ,3	N/RI	G
CYPRINIDONTIFORMES					
Poeciliidae	*Poecilia vivipara* Bloch and Schneider 1801	Barriguidinho	3	N	S

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